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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Herbert Egli

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EXAMINER

WEISS, PAMELA HL

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/526,953	Applicant(s) EGLI ET AL.	
	Examiner PAMELA WEISS	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 21-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 21-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 16, 2009 has been entered.

2. Applicant's amendments filed 6/16/2009 overcome the rejections set forth in the office action mailed 03/19/2009. New grounds of rejection necessitated by the amendments are set forth below.

Claim Rejections - 35 USC § 103

3. Claims 1-4 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bassett et al. (US 6,287,052) in view of Ellenberger (WO 99/18330)

Regarding Claims 1-4 and 22:

Bassett discloses a method for boring rock using a tunnel boring machine (Abstract and C1 L1-4) by injecting into the formation to be bored just before the cutting tools of the boring machine an aqueous foam composition (Abstract and C2 L12-18 meeting the limitation for the material to be injected at the interface of the cutting head and the hard rock) to reduce wear (C2 L36-37). Bassett discloses the boring machine comprises a rotary head with cutting wheels (i.e. discs) (C2 L52-C3 L20 See also

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Figures 1-3) meeting the limitation for hardened steel discs protruding from the cutting head).

Bassett discloses the composition comprises clay a foaming agent as are known and surfactants with foaming agents for convenience in mixing operations. (C4 L16-20) Bassett discloses the composition may include additives, and the foaming agent is a mixture of appropriate commercially available surface active agents yielding a stable form of good quality with good suspension. (C4 L57-61).

Bassett discloses fluids classically perform a dual function to lubricant the contact zone between the cutting tool and the rock and to permit an easier evacuation of the cuttings and to reduce the formation of dust (C1 L55-60) and that wear is reduced not only by lubrication of fluidization of the surrounding medium by reducing the abrasive nature of the rock itself. (C2 L31-39)

Bassett does not disclose the lubricant being a high molecular weight polyethylene oxide.

Ellenberger discloses a method of boring by means of a tunnel boring machine (P1 L29-33) which performs well when the strata through which a tunnel is being bored is relatively hard comprising the injection into the stratum at the cutting face a foamed aqueous composition. (P2 L25-31). (P1 L12-14) by adding at the cutting head a foamed aqueous liquid composition (P2 L6-13 and L26) which comprises a foaming agent (P2 L12 sulphate anionic surfactant), and a lubricant, the lubricant being high molecular weight polyethylene oxides. (P2 L9-10) Ellenberger discloses the polyethylene oxide is commercially available as Polyox (P4 L13) and the sulphate

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foaming agent is also commercially available as Alscope (P4 L12). Ellenberger discloses the foaming materials provide greater efficiency. (P1 L29-33).

Ellenberger also discloses the method: in which the individual ingredients of the foaming composition are dispensed in individual aqueous form (P3 L7-14 and L20) into water and are converted to foam (P3 L20-22); wherein the foaming agent is at least one of anionic or nonionic surfactants. (P2 L12 anionic surfactant); method in which the composition is applied as a concentrate which is diluted with water in situ. (P3 L20-21) to provide the foaming composition; and wherein the polyethylene oxide has a weight average of at least 1,000,000 (P2 L9-10) (meeting the limitations of claims 2-4 and 22)

It would have been obvious to a person having ordinary skill in the art at the time of invention to use the foaming material of Ellenberger in the method of Bassett to provide greater efficiency. Further, since all of the materials of Ellenberger are commercially available and Bassett expressly contemplates the addition of additives and foaming agents of commercially available surface active agents, using the aqueous foaming material of Ellenberger in the method of Bassett would amount to nothing more than to use of a known composition in a known environment to achieve and entirely expected result.

Regarding Claim 23:

Modified Bassett discloses the limitations set forth above. Bassett does not expressly disclose the method in which the concentrate is added in an amount of about 0.5 to about 10kg/m³ of rock removed.

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As the thickness of the layer of the foam as well as the friction resistance and durability of the drill head are variables that can be modified by adjusting the amount of foaming concentrate injected at the site of drilling; therefore, the precise amount of foaming concentrate would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. Applicant expressly states in the Specification at Page 6 Lines 9-15 that the essential requirement is maintain a layer of foam in contact with the rock face and that achieving the requirement is a matter of routine experimentation and the skilled person will easily be able to do it. As such, without showing unexpected results, the claimed amount of concentrate added of about 0.5 to about 10 kg/m³ cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the claimed to obtain the desired thickness of the foam layer and friction resistance for durability of the drill head.

Regarding Claims 24-25:

Modified Bassett discloses the limitations set forth above. Bassett discloses the composition comprises clay a foaming agent as are known and surfactants with foaming agents for convenience in mixing operations. (C4 L16-20) Bassett discloses the composition may include additives, and the foaming agent is a mixture of appropriate commercially available surface active agents yielding a stable form of good quality with good suspension. (C4 L57-61).

Ellenberger discloses the method in which the wear reducing foamable liquid concentrate also contains at least one of a sequestering agent or foam booster (P2 L6-

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12 and L26-31) in which the amounts of the components of the wear reducing foamable liquid concentrate are present in the following amounts:

1.2% polyethylene oxide (P4 L8 thus falling within the claimed range of 0.1 to 3%)

8.58% of the foaming agent (P4 L6 thus falling within the claimed range of 2 -40%)

5% foam booster (P4 L7 thus falling within the claimed range of greater than 0 to 10%)

Ellenberger discloses the use of Cublen K2523 (trademark) as a complexing agent. (P7 L20-21) (note: Cublen K2523 is also sequestering agent identified in applicant's specification) Ellenberger discloses the complexing agent may be used in an amount of 0.02 pbw (P4 L10) thus meeting the claim limitation of greater than 0 to 5% of sequestering agent.

Ellenberger also discloses the method in which the wear reducing foamable liquid concentrate is diluted in 3% solution (P5 L4 thus falling within the claimed range of 1 to about 20 volumes of water) and foamed to provide a volume expansion of 1:10 with air (P5 L5 thus meeting the claim limitation of volume expansion from about 5 to about 40 times the volume of the un-foamed material). Ellenberger discloses the foaming materials provide greater efficiency. (P1 L29-33).

It would have been obvious to a person having ordinary skill in the art at the time of invention to use the foamable liquid of Ellenberger as a concentrate in the amounts set forth and to dilute the concentrate with water and foam to provide the volume expansion in the amounts set forth above, in to order to improve the efficiency of the method of Basset. Further, since all of the materials of Ellenberger are commercially available and Bassett expressly contemplates the addition of additives and foaming

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agents of commercially available surface active agents, using the aqueous foaming material of Ellenberger in the method of Bassett would amount to nothing more than to use of a known composition in a known environment to achieve an entirely expected result.

4. Claims 21 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bassett (US 6,287,052) in view of Ellenberger (WO 99/18330) as applied to claims 1-4 above, and further in view of Scherubel (US 4,796,702)

Regarding Claims 21 and 26 and 27:

Modified Bassett discloses the limitations set forth above. Bassett discloses the use of known foaming agents and surfactants and their mixtures. (C4 L16-21).

Modified Bassett does not expressly disclose a nonionic surfactant being at least one of an alkanolamine, aminoxide, ethoxylated alcohol, ethoxylated alkylphenol, ethoxylated ester, glucose ester, sucrose ester or derivatives thereof.

Scherubel (US 4,796,702) discloses a surfactant mixture with a nonionic surfactant and a cationic surfactant which forms a foamable liquid upon addition to aqueous media for use in cleaning of bores, production wells and a variety of other applications. (C2 L38-52) and (Abstract). Scherubel discloses the use of nonionic surfactants such as fatty acid alkanolamine reaction products, diglycerol esters of fatty acids, glycols, condensates of alkylene oxides with alcohols (i.e. phenols, etc.) (C3 L65-68 and C4 L17-23) Scherubel discloses the foamable composition is stable at reduced loading rates (C5 L15-17).

It would have been obvious to a person having ordinary skill in the art at the time of invention to use the fatty acid alkanolamine reaction product (i.e. alkanolamine) of the condensate of alkylene oxide with phenols (i.e. ethoxylated alkylphenol) of Bassett as a nonionic surfactant to improve stability of the composition of Bassett and since they are known surfactants, their use is expressly contemplated by Bassett.

Response to Arguments

5. Applicant's arguments with respect to claims 1-4, and 21-27 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

6. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

7. Applicant argues that shield tunnel boring machines are different from hard rock tunnel boring machines and that the machine of Ellenberger is not capable of boring through hard rock. Bassett discloses that there are different kinds of boring machines; however, it also discloses a method using a shield tunnel boring machine for hard rock with cutting wheels wherein aqueous foam is used as claimed.

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8. Applicant's argument that the foams are used to facilitate the removal of the material being bored is unpersuasive. The claimed method is disclosed. The method providing other benefits such as facilitating removal of material does not overcome the rejection. Bassett discloses that the fluid fulfills a dual function such as lubricating the contact zone between the cutting tool and the rock and permitting easier evacuation of cuttings. (C1 L55-59)

9. In response to applicant's argument that the purpose of the foaming agent is to reduce wear, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Ellenberger discloses the claimed composition, as such; it will perform the claimed function when used in the method of Bassett. Further Bassett discloses the use of foaming compositions to reduce wear.

10. In response to applicant's argument that one of ordinary skill would not be able to optimize the amount of foaming agent used as Ellenberger does not disclose the function of reducing wear is unpersuasive. Ellenberger discloses the foam composition and method solve the problem of removing soil and clay which clog the cutting head and result in loss of efficiency. (P1 L20-24). Ellenberger in view of Bassett discloses the classical dual functionality of the foam as a lubricant to reduce wear and to assist in soil removal. (C1 L55-60). As such, one of ordinary skill in the art would be able perform the optimization of the amount of concentrate to the amount of rock removed to

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improve efficiency and avoid clogging of the cutting head which will also result in reduction of wear.

Applicant argues that one of skill in the art would not combine Scherubel with the primary reference. Bassett and Ellenberger disclose the use of foam improvers. Bassett discloses the composition may include additives, and the foaming agent is a mixture of appropriate commercially available surface active agents yielding a stable form of good quality with good suspension. (C4 L57-61) Scherubel discloses a *multipurpose* foamable liquid which has a variety of applications including use in bores and wells. (emphasis added) Scherubel discloses the composition is used in fracturing fluids (Abstract). The references are to analogous art. As such, one of ordinary skill in the art would combine the references as set forth above.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAMELA WEISS whose telephone number is (571)270-7057. The examiner can normally be reached on Mon.-Thur. 7:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PW

/Glenn A Caldarola/
Acting SPE of Art Unit 1797